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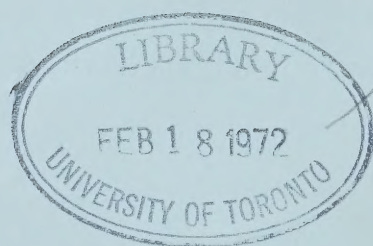
Regarding

RELATIVE PAYMENTS FOR HIGHWAY USE

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by The Railway Association of Canada

Montreal, Que.
December 18, 1961



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RELATIVE PAYMENTS FOR HIGHWAY USE WHICH SHOULD BE MADE BY
THE DIFFERENT TYPES AND WEIGHT GROUPS OF MOTOR VEHICLES

The Railway Association of Canada appreciates the opportunity of contributing to your study on the relative payments for highway use which should be made by the different types and weight groups of motor vehicles. This study is important for two main reasons. First, expenditures on roads and streets comprise the largest single item in Ontario expenditures. Second, the method adopted in financing these expenditures has a direct bearing on the conditions of competition governing the transportation industry.

Basic to your study is, of course, this question:-

Who should pay for roads and streets and how much?

With respect to who, there have been three distinct stages in the development of government financial responsibility for the provision of roads and streets:

1. Prior to the operation of railways, roads were the only effective means of land transportation,- as such their primary function was one of transportation. Consequently they were operated by private turnpike trusts and were supported in their entirety by user tolls.
2. With the coming of rail transportation, toll roads fell into disuse and the government assumed the responsibility for the construction and maintenance of roads required for property access purposes.
3. With the advent of the motor vehicle the dominant function of roads and streets has once again become that of transportation.

These, therefore, form the basis for the first guiding principle with respect to the financing of highways which today serve first and foremost - indeed, their design and construction are entirely consequent upon - the needs of the motor vehicle. As such, they are special services for which direct users should pay the predominant share of costs. The elements of motor vehicle operation are the vehicle and the roadway. The vehicle is provided privately by individuals and business firms. While roads must of necessity be provided by government, there would seem to be no sound reason why they

should not be financially supported in the main by users as are the vehicles, which users provide.

As for the second basic consideration of highway finance, competition within the transportation industry, the Ontario "Select Committee on Toll Roads", in its report issued in 1956, placed this aspect of the problem in proper perspective when it stated (p.8):

"Highways must compete with railways, waterways and air transport as a means of travel. Each form of transportation has developed a system whereby it is not too difficult for any shipper or traveller to decide which means suits his requirements best. There is, of course, overlapping, but if the user is left free to choose, competition should show which transportation system is subject to the greatest demands and requires development

... if the tax burden on motor vehicles is sufficiently unrealistic to require the construction and maintenance of roads out of other tax revenue sources, then this in effect means that the roads transportation system is subsidized by the general taxpayer. A healthy economy requires the development of the most effective and efficient means of transport to serve the majority of users, with the cost apportioned in a fair and just tax system."

For a sound competitive framework within the transportation industry it is essential that highway transport, which is directly competitive with other carriers, should pay its fair share of highway costs. Otherwise, unequal conditions of competition must inevitably result in traffic allocation being dependent in part on public taxation rather than on the relative operating costs of competing carriers.

The Position of the Railway Industry

The railways have a definite interest in the adequacy of user charges. To the extent that their competitors use publicly-provided rights of way and other transportation facilities without repayment of full related costs, they enjoy an unfair competitive advantage over the railways. There is no justification for such direct and harmful discrimination. Fair competition is the essence of any free enterprise system.

The interest of the railways in user charges is often interpreted by those who oppose such charges as an interest in ruining their competitors. This is untrue. Universal establishment of fully compensatory user charges and their application to all modes of transportation using public facilities would leave those modes in a position

to pursue their sound economic development. Since each mode of transportation has certain cost and service advantages peculiar to it, all must be employed for the best accommodation of the public.

The railway industry is pledged to the support of the principle of diversification in transportation. It is actively sponsoring measures which would remove present discriminatory handicaps designed to prevent railways from engaging in other forms of transportation. Today several railways operate trucks and will continue to do so after compensatory highway user charges are imposed. Railways welcome the opportunity to compete with other modes of transportation on an equal basis. For example, pipe lines diverted a tremendous amount of traffic from railways, but there has been no railway complaint against them. This achievement was made possible by the inherent transportation advantages of pipe lines, not subsidy. In welcoming equitable competition, railways fully expect to pay compensatory user charges imposed for any publicly owned transportation facilities they may use.

This attitude is receiving widespread public acceptance. In his budget message for the fiscal year ending 1957, President Eisenhower said:

"Many services performed and privileges granted by the Government in the public interest also convey a special, added benefit to individuals or groups who can afford to pay for them. In some cases, the services are now provided without charge. In other cases, the fees are substantially below the costs of providing the services. Thus, the general taxpayer is required to subsidize operations which should be self-supporting. The scope and cost of these hidden subsidies have grown considerably during the past decades. I firmly believe in the principle that Government services which give a special benefit to users should be financed by adequate charges paid by the users."

Besides the need to identify the user with the cost of supplying a service, it is also evident that sources of tax revenue which are not endless, have approached such a high level that extreme care must be applied by any government in determining where it will levy its charges, with due regard to the effect such charges may have upon the economic health of the recipient. Unless we are simply to follow the questionable policy of taxing what the traffic will bear, we must attempt to examine carefully the consequences of our revenue measures.

It is with this in mind that user charge studies have been undertaken in several areas of transportation in the U.S.A. The Department of Commerce recommended in the past Session of Congress a user charge upon aviation fuels and lubricants. At the request of the Bureau of the Budget thorough study has also been made of a method of imposing reasonable charges upon the inland waterways. These are not desperate efforts to raise funds to meet a large United States governmental budget in an era of heavy defense expenditure, but rather an effort to rationalize the contribution made by government as well as that made by the transportation industries. These considerations should be kept in mind in any attempt to develop as equitable and fair a method of reimbursement for current and capital expenditures as may be conceived in what is admittedly a complicated and difficult field.

Resistance to user charges has in the past usually been based on:

- 1) the asserted difficulty of putting into effect an "equitable system of charges;
- 2) the asserted necessity for a gradual approach to avoid "dislocations"; and
- 3) the contention that compensatory user charges would "destroy" operators using public highways.

No progress towards a sound user charge program will ever be achieved unless these arguments are recognized for what they are - skillful efforts to avoid just and equitable payments.

The Highway Finance Problem

Reduced to its simplest economic terms, today's road-street problem is one of demand for facilities greatly exceeding supply. There are two main reasons for this situation. First, the growth in the number of motor vehicles has greatly outstripped the financial ability of governments to expand their road and street programmes. Second, the increase in the number of heavy commercial vehicles with characteristic requirements for roads of increased carrying capacity has meant the need for a much higher standard and more costly system of roads and streets.

The supply side of the problem is explained by the fact that highway funds in the amounts required have not been available. There are several reasons for this, the more important of which is that while increased highway revenues have resulted almost entirely from the increased number of motor vehicles, basic charges or taxes for the use of highway facilities have increased only moderately compared with the increased costs of providing those facilities. Moreover, the change in the composition of postwar highway traffic, heavy commercial vehicles making up a much larger proportion of the total, has added new expenditures without a commensurate increase in motor vehicle revenues. In addition, inflation which has sharply increased road construction and maintenance costs has reduced the purchasing power of the revenue dollar.

A Review of Motor Vehicle Taxation Policies

At the close of World War II many States faced with the need for an extensive highway modernization programme involving very large expenditures and unable to obtain immediate approval for necessary motor vehicle tax adjustments, authorized private turn-pike trusts to build toll roads along select routes where traffic congestion had become chronic. Toll roads, however, were recognized as a temporary expedient and not a permanent solution since they offered no relief from traffic problems in urban areas where, on the contrary, they aggravated congestion by channelling greater volumes of traffic into cities. Indeed, the fact that they were economically feasible only adjacent to urban areas generating large traffic volumes was an additional factor limiting their wider acceptance.

Each State confronted with the problem, however, and the Province of Ontario as well, sought a solution through detailed study of traditional motor vehicle taxation policies. In the main these studies were made necessary by a change in the composition of traffic, in particular by the increasing proportion of large and heavy commercial vehicles. Evidence showed that roads and streets were being worn out prematurely by the operation of heavy repetitive loadings in excess of the roads' structural design capacity. For example, as far back as 1949, Thomas H. MacDonald, Commissioner of the

United States Bureau of Public Roads, an engineer of international reputation, stated at a meeting of the American Road Builders Association:

"With the marked increase in heavy loads since the end of the war, the damage to highways has become even more alarming. Damage has occurred on all types of high type pavements. There is conclusive evidence that this damage is caused by heavy wheel loads. This matter has been the subject of serious study by practically every highway research agency, and they all reach the same conclusion - the damage occurs only on pavements subjected to frequent heavy wheel loads, particularly overloads."

A substantial proportion of the cost of modernization of roads, therefore, was found to be due to the design features or geometrics built into the new and improved roads to support such loads. The 1956 Report of the "Select Committee on Toll Roads" in Ontario stated (p.12):

"....authorities say that planned highway construction must take into consideration not only the number of vehicles demanding transportation facilities, but the type of vehicle and particularly those of increased size and weight. Major highways must be built to an adequate standard to carry the biggest and heaviest vehicles. On divided controlled access highways this requirement has been met in Ontario and consequently cost per mile of road varies from a low of \$500,000 per mile to costs in excess of \$1,000,000 in built-up areas. We were advised that future construction, even in the most favourable areas, would probably cost over \$600,000 per mile. Maintenance costs on controlled access highways such as No.400 are between \$5000 and \$6000 per mile, whereas a standard two-lane highway has an annual maintenance cost of approximately \$1500 per mile."

While the increasing size and weight of vehicles have substantially increased initial road costs, the tendency to load vehicles beyond legally prescribed load limits, the practice of overloading, by reducing the normal life expectancy of roads and streets, has served to undermine the existing capital investment in highways. In any examination of highway finance, it is extremely important therefore that the relationship between overloading and capital investment be considered, for surely the conservation of the existing capital investment in highways is equally as important as the question of building additional facilities.

Existing User Charges

(a). Fuel Taxes

Studies undertaken by Ontario and various American States have revealed that the incidence of the gasoline tax, traditionally the most productive source of highway revenue, is highly discriminatory as between vehicles of different sizes and weights. Introduced at a time when the majority of motor vehicles were of the same size and weight, consumed the same kind of fuel and in roughly equivalent amounts per mile, tax payments were commensurate with actual use since gasoline consumption, largely a function of weight, varied directly with mileage. The same is still reasonably true today, at least for passenger cars and other light vehicles, and gasoline consumption provides a reasonably accurate measurement therefore for assessing these vehicles their fair share of highway costs.

For heavy vehicles which vary greatly in size and weight and frequently operate as combinations, however, the situation is altogether different. As the weight of the vehicle increases beyond a certain point the proportionate amount of gas consumed in relation to weight carried per mile decreases, so that in effect the heavier vehicles receive greater highway benefits per unit of tax. All studies have concluded that fuel consumption is an unreliable measure of highway use for large vehicles; that continued use of the gasoline tax as the principal component of the highway user tax bill simply means that heavy trucks fail to pay their equitable share of highway costs; and that passenger cars and other light vehicles have to make up the deficit.

The Report of the Ontario "Select Committee on Toll Roads and Highway Financing" stated (p.31):

"There is room for argument on the equity of any particular set conditions, but it is obvious to the Committee that an increase in the gasoline tax falls most heavily on the light motor vehicles. A simple increase in the rate per gallon of gas tax would mean that approximately 90% of the burden would be paid by the passenger cars and light trucks in relation to use and number of registrations. A fuel tax per gallon would be the ideal system of

taxation if all vehicles weighed the same amount and travelled the same distance per gallon. It is obvious, however, that that is not the case. The heavier vehicles while using more fuel per vehicle mile of travel than lighter vehicles, use less fuel per unit of weight hauled. This is easily understood when one considers that a passenger car weighing approximately two tons travels some 18 miles per gallon and thereby obtains 36 ton miles of operation for 11 cents tax. A truck weighing 46,000 lbs. or 23 tons, obtains 5 miles per gallon of gasoline or 115 ton miles of operation for 11 cents. This becomes even more important when it is realized that a truck combination weighing 68,000 lbs., or 34 tons, travels 4 miles per gallon and therefore obtains 136 ton miles of operation for 11 cents. The passenger car obtains approximately one-quarter of the ton miles of use compared to the 34 ton vehicle for the same amount of gallonage tax."

(b) License Fees

These studies have similarly found license fees to be an unreliable measure of highway use. While fees are graduated according to vehicle weight, they do not take into account mileage hence are discriminatory in their application against low mileage vehicles. A vehicle registered at a specific gross weight pays a standard license fee irrespective of whether it operates 10,000 or 100,000 miles a year. For example, a motor vehicle having a maximum gross weight of 40,000 pounds, licensed at \$400 per year would pay 1.6¢ a vehicle mile if operated 25,000 miles a year, but only 0.4¢ if operated 100,000 miles annually. This sharply tapering effect, favouring the heavy mileage vehicles, is an inherent weakness in the application of the license fees to vehicles of similar weight but different highway utilization.

A summary statement "Equitable Road User Taxation in North Dakota", published in 1957, states (p.1)

"The assumption is sometimes made that the present combination of fuel taxes and license fees leads automatically to an equitable assignment of highway costs. This is by no means the case. It is obviously unfair that the operators of vehicles travelling a few thousand miles annually are required to pay license fees falling in the same bracket as those paid by the operators of vehicles which travel a hundred thousand miles annually. This inequity in license fee charges is not compensated for by any built-in equitability in the fuel tax.

The fuel consumption of large trucks as compared with that of passenger cars does not increase anywhere near the proportion to weight. Data indicate that passenger cars require about 3.24 gallons of fuel per 100 ton-miles. In contrast, large diesel

trucks require less than one-fourth as much fuel as do passenger cars. If increased highway costs were to be paid out of a one-cent increase in the gas tax, only 8 per cent of the revenue would come from trucks weighing 24,000 pounds or more. According to one of the best approaches to equity, the portion of highway program costs which should be borne by vehicles weighing 24,000 pounds or over would be 32 per cent. Hence, the heavy trucks are actually paying in gas taxes only one-fourth of the share indicated by their cost responsibility."

(c) Reciprocal Tax Agreements.

Many of these studies have also noted a further difficulty with regard to license fees, namely the problem of reciprocal tax agreements. Reciprocity, in effect, amounts to the waiving of license fees for out-of-state vehicles, thereby giving rise to discriminatory treatment between resident and non-resident vehicles.

The United States National Association of Tax Administrators made a study of the principle of reciprocity as applied to heavy commercial vehicles. Among its conclusions were the following:

"While interstate motor carriers should be required to pay no more than their fair share of highway costs, the application of full reciprocity is no solution to the complex problem of motor vehicle taxation. It is arbitrary and has created more problems than it has solved."

Existing User Charges - Conclusion

Recognizing the deficiencies of the existing forms of taxation as they apply to large vehicles (see Table II, which indicates that road user charges per ton mile at present discriminate in favour of the large vehicle) and taking into account the inability of registration fees to adequately reflect mileage and also the deficiency of the gas tax as a measure of weight-use, it is not surprising that a trend away from this so-called 'two-structure' highway tax system has become pronounced in recent years. The adoption for heavy vehicles of a tax which combines both mileage and weight factors has gained favour and as a result weight-distance or weight-mileage taxes graduated according to vehicle weight and directly variable with mileage have been introduced.

Weight-Distance Taxes

The three principal types of weight-distance taxes are the weight-mile tax as found in Oregon and New York; the axle-mile tax in Ohio; and the ton-mile tax in Colorado. The weight-mile and axle-mile tax, while similar in principle, differ from the ton-mile tax in two basic respects - these taxes are related to the cost responsibility associated with vehicles of different weights; and there is only one variable, mileage.

(a) Axle-Mile and Weight-Mile Taxes

Axle-mile and weight-mile taxes are both based on the principle of a scientific cost responsibility for each weight group of vehicles. Briefly, they embody what is known as the incremental method of cost allocation which assigns tax responsibility in accordance with the cost of providing highway standards required by vehicles of different sizes and weights. The tax responsibility of each weight group is expressed in a mileage tax, and the total tax paid by each vehicle is the product of the weight times the miles it has travelled. The Oregon and the New York tax both incorporate the gross weight theory of taxing the laden vehicle, a theory that holds that it is the laden vehicle for which roads must be built. The New York tax applies generally to all vehicles having a maximum declared gross weight in excess of 18,000 pounds; the Oregon tax applies to all commercial vehicles with the proviso that trucks 6,000 to 18,000 pounds may elect to pay flat-fees, instead of the mileage taxes.

(b) Ton-Mile Taxes

The ton-mile tax, on the other hand, is based not only on the principle of differential costs of building highways for vehicles of different sizes and weights, but also on various benefits received by vehicles of different sizes and weights. Hence the tax varies both with the load and mileage.

In the case of axle-mile and weight-mile taxes the weight factor remains constant, whereas the ton-mile tax which is based on the actual weight for each vehicle movement involves maintaining records of weights as well as mileage.

Objections to Weight-Distance Taxes

Despite the growing popularity of weight-mileage taxes these taxes have been subject to certain criticism, not, it should be pointed out, with respect to their equity, but with their administration.

Those opposed to weight-distance taxes have raised the following objections to this form of taxation:

- (a) Administration costs are high in relation to the additional revenues raised.
- (b) Maintenance of operating records is burdensome.
- (c) The principle of reciprocity is undermined by weight-distance taxes.
- (d) Motor carriers' operating costs are increased, and these increases are passed on to shippers in the form of higher charges.

These objections have been examined on a number of occasions both by government bodies and independent groups. Their findings have been as follows:-

(a) Administration Costs

In the 1960 Annual Report of the Public Utility Commissioner of the State of Oregon it is shown that the cost of collecting the State weight-mile tax for the twelve months ending December 31, 1960, was \$495,476 or 3.21% of the \$15,406,771 collected. Moreover, the figures have been decreasing each year from 4.05% in 1954 to 3.21% in 1960.

Revenue by Type of Fee - Oregon 1960

<u>Type</u>	
Mileage Fee	\$13,039,363.65
Monthly Flat Fee	1,883,966.94
Quarterly Flat Fee	222,195.09
Penalties	195,506.37
Interest	89,553.31
Plate Fees	175,150.00
Pass Fees	40,139.13
Hearing Fees	975.00
Convoy Fees	5,873.50
Miscellaneous	1,461.56
Total	<u>\$15,654.184.55</u>

Revenue by Class of Carrier - Oregon 1960

<u>Class</u>	
Regular Route - Passenger	\$ 354,204.71
Irregular Route - Passenger	14,447.24
Regular Route - Freight	1,938,574.78
Irregular Route - Freight	4,659,018.86
Contract Freight	278,377.69
Private	5,912,081.79
Special	<u>2,497,479.48</u>
Total	\$15,654,184.55

The Ontario Select Committee on Toll Roads and Highway Financing (page 39, 1957 Report) was advised by Mr. Charles F. Conlon of the National Association of Tax Administrators that -

"The weight distance tax most certainly can be enforced and enforced effectively. While such a tax would be more expensive to administer than a sales tax it certainly would not be more expensive than the cigarette taxes enforced in several States."

Mr. George Gathercole, Deputy Minister, Department of Economics, Ontario, reported to the same committee that in comparison to the cost of collecting and auditing the weight-mile tax in Oregon, 3.88% at the time, the cost of collecting sales taxes in Canada (1951-1952) ranged from 4.18% to 5.85%.

In summary, it may be said that it is sound administrative opinion that a mileage tax graduated by gross weight categories can be effectively enforced at a reasonable cost.

(b) Record Keeping

The ton-mile tax, using both weight and mileage as variables, requires more record keeping than the weight-distance tax. It is for this reason that the weight-distance tax has been adopted by a number of States in preference to the ton-mile tax. The ton-mile tax is nevertheless a more scientific method of allocating cost responsibility than any other form of weight-distance tax.

For small operators any form of weight-distance tax requires the maintenance of records which otherwise might not have to be kept. But weight-mile taxes generally apply only to vehicles over 18,000 pounds, and operators of vehicles of this size maintain records of the type required for weight-mile taxes. The New York State report on Carrier Taxation, 1958 states, for example (p.38):

"The tax applies to all vehicles (except farm, rural mail and government vehicles) having a declared combined weight of vehicle and load in excess of 18,000 pounds and is levied on mileage. Rates begin at six mills per mile for vehicles weighing from 18,001 pounds to 20,000 pounds maximum gross weight and are graduated for each 2,000 pounds of weight to a maximum rate of 35 mills plus two mills per ton for vehicles in excess of 76,000 pounds."

The only records that are required to be kept are mileage. Nearly all vehicles over 18,000 pounds operate under United States Government I.C.C. regulations, which require them to keep such records. Industries maintaining private carriers require them to keep records also. There are very few transporters who were not already keeping these records prior to the New York weight-distance tax adopted in 1951, either for the above reasons or for income tax purposes.

(c) Reciprocity

It is argued that weight-distance taxes undermine the principle of tax reciprocity. This matter has been given careful consideration by courts as well as by highway tax officials.

The Report of the New York State Joint Legislative Committee on Carrier Taxation, 1955, stated (pp.45-46):

"Reciprocity was never intended to be a device to insure that a vehicle, simply because it operates between states, would completely escape its tax responsibility for the costs it occasions, the use it obtains and damage it does. As previously developed, any tax measure which provides that inter and intra state vehicles shall be taxed without distinction or discrimination completely satisfies the requirements of reciprocity...."

Finally, the argument that weight-distance taxes undermine reciprocity was carefully considered by Mr. C.A. Rothrock, State Planning Engineer, West Virginia

Department of Highways, in his remarks to the 34th Annual Meeting of the Highway Research Board. Concerned with the discriminatory aspect of reciprocity against resident vehicles, he stated:

"It would appear that the remedy would lie in a tax based upon determinable units of road usage, whereby all users of the affected classes would pay in proportion to their usage, regardless of the state of registration. Of course this method would upset the present agreements of reciprocity between states, at least for those classes of vehicles of which the above-mentioned condition exists; but it can be argued that reciprocity has been outmoded by the event which has brought about the present situation for which it offers no solution except by discrimination."

(d) Increased Transportation Charges

The relatively small effect this form of taxation would have on motor carriers' charges was illustrated in a study undertaken by a Montana "Fact Finding Committee on Highways". Considering the effect of a weight-distance tax on consumer prices it found:

"For most goods bought by consumers, the possible effect of the proposed Montana weight-distance tax is negligible. For instance, the most heavily affected among a selected group of grocery items is potatoes, where the possible increase under certain conditions of transport approximates 1/10 of a cent on a 10 pound bag of potatoes retailing for 57 cents. Among items of home furnishings typical impacts run even smaller."

Enforcement Problems

In addition to the above objections to the weight-distance tax, it is recognized that enforcement and administration are not simple. Records must be kept and government auditing maintained. Experience elsewhere has shown that administration and enforcement are possible at a reasonable cost.

For a weight-distance tax with only one variable - mileage - the problem of enforcement is one of maintaining mileage reports. It is claimed that this creates additional problems for carriers, but evidence would suggest that operators keep mileage records. For example, it is the carriers' only way of knowing whether or not

operations are profitable. With the necessary mileage figures available, therefore, administration and successful operation of a weight-distance tax resolves itself into the problem of processing mileage reports and assessing tax liability.

Apart entirely from any consideration of equity in highway financing, certain indirect benefits result from the adoption of a weight-distance tax. An important part of control, and a point frequently overlooked, concerns the provision of weighing stations. This has resulted in an increased awareness and respect for legal highway weight limitations, and has contributed much towards solving one of the most serious problems facing highway administrators - illegal overloading. Thus weight-distance taxes have also directly resulted in measures which have served to protect the existing investment in highways. The 1955 Report of the New York Joint Legislative Committee on Carrier Taxation stated (p.39):

"An important by-product of the weight station enforcement of the weight-distance tax is a long-overdue attention to State weight limitations set forth in Section 14 of the Vehicle and Traffic Law. Previous to installation of these stations, weight enforcement was practically non-existent. Limited State Police personnel and ridiculously inadequate weighing equipment resulted in wholesale overloading practices from one end of the State to the other. On a nationwide basis, 2 per cent of all vehicles were operating with illegal loads. In New York State 14 per cent of our vehicles were illegally loaded. Fines resulting from violations apprehended at weigh stations amount to hundreds of thousands of dollars annually but the years of wanton disregard of weight limitations have cost New York taxpayers millions of dollars."

Recent United States Experience

It is realized that certain American States have repealed ton-mile tax legislation and in this connection it should be stated that while a ton-mile tax is a weight-distance tax, a weight-distance tax is not necessarily a ton-mile tax. Two variables are involved in administering and enforcing a ton-mile tax - weight and distance. Each time one of these factors changes the tax must change. With a weight-distance tax, mileage is the only variable. Hence the enforcement and administration of a ton-mile tax is more difficult than for a weight-distance tax. This is an important reason why ton-mile taxes have been repealed by certain States, and as has

been noted was the reason why the Ontario Select Committee reported adversely on a ton-mile tax and favourably on a weight-distance tax.

Although six States repealed such taxes between 1937-1939, the taxes repealed had few of the characteristics of the type of weight-distance taxes which have been adopted by Oregon, Ohio, Wyoming, Colorado, Idaho and New York in recent years.

Commercial Vehicles' Proportion of Road Costs

In order to ascertain the proportion of Ontario's road costs which should be borne by commercial vehicles it would be necessary to undertake a cost allocation study or to rely upon the findings of other studies which have been carried out. There have been a number of studies made in the United States which may be of some guidance in the consideration of this problem.

The majority of these have used either one or other of two widely recognized theories of highway cost allocation, the Incremental and the Ton-Mile analyses. The ideal study, of course, would be one which employed both methods for comparative purposes. Fortunately, a study recently released by the Secretary of Commerce of the United States, "Highway Cost Allocation Study" (or 210 Study), undertaken at the specific request of the United States Congress to ensure an equitable distribution of the tax burden among the various classes of vehicles using highways, made use of four methods, summarized in Appendix 1. These are the Incremental, the Ton-Mile, the Cost Function (sometimes favoured by the trucking industry), and the Differential Benefit method which purports to allocate tax responsibility according to the benefits derived by vehicles of various dimensions and weights.

While it is recognized that the results of these studies would not have precise application to Ontario, nevertheless it may be useful to examine the range of cost responsibilities which might reasonably be expected to result if any one of these theories were used.

Road User Charges - Ontario 1960, and United States,- Recommended Practice

Table III sets out recommended United States average road user charges and Tables IV and V provide comparisons with Ontario averages in terms of cents per vehicle mile as well as in absolute terms.

An examination of Table IV indicates a considerable disparity between United States practice as recommended by the Highway Cost Allocation Study (210 Study) and present road user charges in Ontario, 1960. In Ontario buses and light vehicles comprising passenger cars, pick-up trucks, stake trucks and vans, largely confined to urban and interurban service, travelling relatively few miles per year, pay more per vehicle mile than do similar United States vehicles. By contrast, heavier Ontario licensed intercity trucks pay considerably less per vehicle mile than US trucks. Two examples will suffice to illustrate this contention. In the United States a van type truck travelling 15,000 miles per year pays in State and Federal taxes on average approximately 2.08 cents per vehicle mile as compared with 3.25 cents in Ontario. However, a diesel powered tractor semi-trailer combination pays 5.98 cents per vehicle mile in the United States and only 4.52 cents in Ontario.

These points are shown even more clearly by the index in Table IV of cents per vehicle mile in terms of passenger car costs. The index of United States charges indicates that while vans pay 2.5 times as much per vehicle mile as passenger cars, Ontario road user charges are heavier at 3.1. In contrast to these high Ontario charges for light vehicles, in the United States a large intercity truck, such as a diesel powered tractor semi-trailer combination, would pay 7.2 times as much per vehicle mile as a passenger car, whereas Ontario shows the same vehicle paying only 4.30 times as much as a passenger car. In summary it can be stated that recommended United States practice if employed in Ontario would result in slightly lower road user charges for small trucks in urban and interurban operation and increased charges for large intercity trucks.

Evidence presented in these tables therefore indicates that a substantial proportion of commercial vehicles in Ontario are in weight categories which, compared with the findings of the 210 Study, may be said to be paying more than their fair share of tax revenues. Moreover, since many of these operate exclusively within urban areas, their contribution towards provincial highways is to a considerable extent unwarranted. The problem of determining an equitable share of motor vehicle taxation for commercial vehicles, therefore, cannot be resolved by merely determining their fair share as a group. It is quite probable that certain categories of commercial vehicles are contributing more than their fair share at present or are cross-subsidizing other weight classes. Their tax contribution in total, therefore, should be clearly distinguished from that made by specific classes of commercial vehicles. The proportion of taxes that intercity commercial vehicles, as distinct from urban commercial vehicles, contribute, compared with the additional costs built into highways to meet their weight and size requirements is a question of significance to your enquiry.

Nevertheless a comparison of specific classes of vehicles reveals wide variations in the contribution these are making on a weight-use basis. In Table II estimates show that a passenger car in Ontario pays .60¢ per ton mile compared with .16¢ for a large diesel powered combination. This table also reveals an even more striking example as between light and heavy commercial vehicles, a pick-up truck paying .72¢ per ton-mile in user taxes or roughly 4 times as much as large gasoline and diesel powered combinations.

Summary

Fixed annual fees ignore differences in annual mileages which vary widely for vehicles of the same size and are therefore economically unsound for the following reasons:

- (i) If the fees are set high enough to return the required revenue, they will be prohibitive for low mileage vehicles.
- (ii) If the fees are set low enough to be within the reach of low mileage vehicles, they will not return the necessary revenue.

In contrast, highway use as a measure of tax responsibility for motor vehicles has universal acceptance as a basis for taxation of passenger cars. It is also a well recognized precept that transportation charges of all carriers are based on factors of weight and distance. An equitable highway use tax therefore would be one in which the payment per mile would be in direct proportion to the weight of the vehicle - in short, a weight-distance tax.

There is nothing 'mysterious' about the term weight-distance tax and it is not merely a theory. It is the only fully defensible standard for the measurement of transportation charges, since it is based upon the two principal components - weight and distance. To question its fairness is to suggest that certain vehicles should obtain special advantages over other vehicles in the same group or class such as more mileage or weight allowance or both, for the same tax payment.

It would be appropriate at this point to draw to your attention the views of the Ontario Select Committee on Highway Finance concerning a ton-mile tax. The report of that committee commenting adversely on such a tax, said: (p.40):

"The ton-mile tax is based on two variables, namely, the weight of the vehicle plus its load and the operating mileage. This tax was ruled out by the Committee as it was felt that the two variables of weight of vehicle plus load and mileage of operation are impossible to compute in a manner that is enforceable, for instance, any reduction in weight such as deliveries of articles enroute would change the tax base on the same vehicle and create an impossible administrative problem."

Thus the Committee would appear to have been opposed to this form of tax, not from the standpoint of tax equity or as a revenue measure, but for enforcement and administrative reasons.

Moreover, in the same report the Select Committee recommended the introduction of a weight-distance tax: (p.38)

"The Committee further recommends that immediate studies be instituted to develop the necessary rates for the imposition of a weight-distance tax."

The March 13, 1958, issue of the Toronto Globe and Mail, discussing the status of the weight-distance tax proposals for Ontario, carried the following report:

"The Ontario Government is preparing for the day when a weight-distance tax will be imposed on all highway carriers in the province. Premier Frost said yesterday that his officials were giving intensive study to the question, and that they had studied systems, in the United States. He stressed that the problem of administering the tax was a complex one, and required considerable study.

Weight scales now being erected at numerous points in the province would be used in determining the tax, the premier said. He did not believe, however, that the weight-distance tax would be a reality before another year at least."

In conclusion Mr Minister, the very sharp postwar increase in motor vehicle registrations, combined with the radically changed composition of traffic in recent years has not only rendered large segments of the highway system obsolete, but also the traditional methods of financing them. The combination of gasoline tax and license fees neither raises sufficient revenues to provide the facilities necessary for today's and tomorrow's traffic; nor does it raise them equitably between light and heavy vehicles. Increased gasoline taxes bear disproportionately on light vehicles, and increased registration fees, on vehicles which use highways only sparingly. It seems therefore that in addition to these taxes, consideration should be given to the use of taxes which reflect both weight and mileage.

It should be emphasized that this Association's interest in the matter of road user taxes is not with the imposition upon our competitors of taxes, as such, but specifically with the question of equitable highway user charges which form an integral part of the cost of highway transportation. While historically taxes have been levied for the general support of Government, it is our contention that highway charges, though frequently referred to as taxes, are for the sole purpose of recovering the cost of building and maintaining roads and streets. It is a matter of vital concern therefore to the railway industry that commercial vehicles contribute their fair share of these costs if competition within the transportation industry is to be meaningful. This is

of utmost importance if traffic is to be encouraged to move by the most efficient carrier where efficiency is measured in terms of the relative costs.

Payment on the basis of 'how much does it weigh - how far does it go', a basic principle in various segments of our economy, is the foundation of transportation rate-making. There would appear to be no sound reason why it should not be used as a basis of payment for highway use, highways being predominately a function of transportation. The Railway Association of Canada, therefore, on behalf of its member lines, recommends that the Province of Ontario adopt a weight-distance tax for commercial vehicles operating on its highways.

The Railway Association
of Canada
Montreal, Que.
December 18, 1961.

SUMMARY OF INCREMENTAL, COST FUNCTION, DIFFERENTIAL BENEFIT
AND GROSS TON-MILE THEORIES OF
HIGHWAY COST ALLOCATION

(a) Incremental Theory

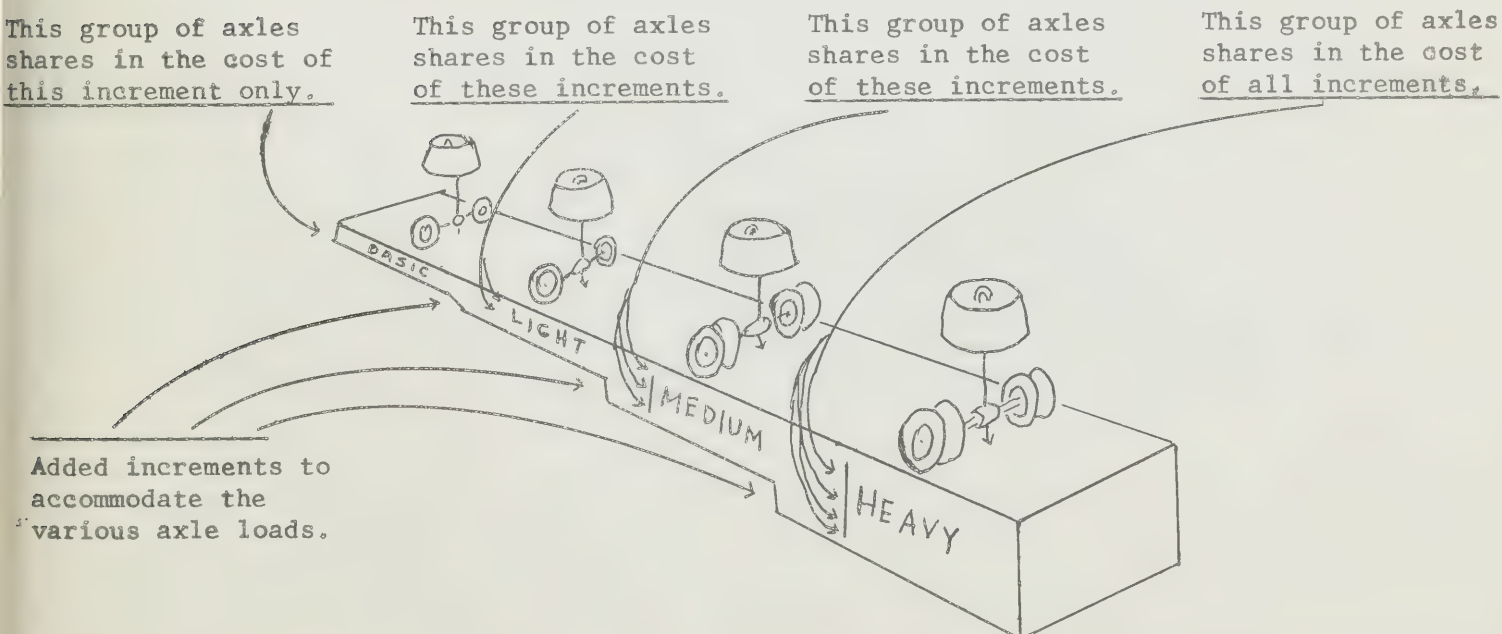
Existing roads and streets are designed, with few exceptions, for a mixture of motor vehicle traffic of varying characteristics, therefore, the problem of equitably allocating costs among groups of vehicles is one of determining successive increments of costs which may be associated with an ascending scale of vehicle sizes and weights, starting with the cost of a basic highway suitable for the requirements of the lightest or passenger-type vehicle, and ending with the heaviest weight group which is legally permitted to operate on roads. The incremental analysis considers in turn each element of road costs such as pavement thickness, width of road, gradient and alignment, structures, maintenance, etc., in an attempt to scientifically determine the extent to which the cost requirement of each element of the road varies with vehicle size and weight.

The incremental concept may be simply illustrated by reference to the variation in the cost of one of the components of a modern road-pavement thickness. A thickness considered adequate for the passenger car type of vehicle is selected and all vehicles are charged with the cost of pavement of that thickness. The cost of the second increment of pavement thickness, or that required by vehicles of the first weight group above the basic is charged to all but passenger cars or commercial vehicles of comparable weight. The cost of each successive increment of pavement thickness is charged to those vehicles responsible for the additional or incremental cost. Thus vehicles in the heaviest weight group are charged with the entire cost of the last increment of pavement thickness and also with their pro rata share of each previous increment, including the basic road.

Other elements of highway cost are allocated in a similar manner.

The incremental theory is illustrated in the diagram below:

Incremental Approach to Highway Cost Allocations
Pavement Design Standards for Various Axle Loads



The incremental concept is essentially an engineer's approach to highway cost allocation. It has had wide application in studies of recent years and is generally accepted as the most equitable and scientific of the alternative theories.

Although scientific and simple in concept, its application is difficult. Roads and streets must be grouped in such a way that all roads and streets within a class are similar in traffic characteristics, design standards and costs. Vehicles too must be grouped in such a way that all vehicles within a group have similar effects on road costs, and the amount and distribution of travel of each group must be determined. The full resources of experience and judgment are required to appraise the effect of the various vehicle classes on design standards and costs.

(b) Gross Ton-Miles Theory

The gross ton-mile theory is simply a measure of highway use, the ton-mile being considered the most appropriate unit of measurement for this purpose. Roads are considered to be joint facilities for the benefit of all vehicles. Therefore total costs should be distributed over all vehicles on the basis of the use made of the highway as reflected by the product of miles travelled and weight of the vehicle.

Unlike the incremental, but like the cost function method, no consideration is given to the cost of the basic road, total highway costs being distributed among all vehicles. The gross ton-mile method has had wide application in highway cost allocation studies, particularly by economists who view highway costs as essentially "joint" and "common" rather than "incremental".

A gross ton-mile analysis normally results in a larger cost responsibility being assigned to heavy commercial vehicles than the incremental method. Mr. W.L. Hall, Director, Montana Fact Finding Committee on Highways and Mr. R.D. Johnson, Research Engineer, Montana State Highway Department, in a joint paper "Comparison of Incremental and Ton-Mile Allocation Methods" commented as follows:

"One of the advantages of the ton-mile allocation of costs is the simplicity with which it may be applied and the relative availability of the necessary data. Perhaps the greatest disadvantage in the incremental method is the difficulty of obtaining precise information and of developing all the necessary cost breakdowns and traffic data that is essential to a competent study. While the ton-mile allocation in Montana does result in a more severe allocation to heavy vehicles and a fairly sharp reduction of charges against the passenger car, it nevertheless does provide an allocation that runs in the same order as incremental cost responsibilities. This fact, along with the possibility that across the board ton-mile allocation may be more fair in the case of the substantial subsidization of local roads, seems to lend credence to this type of allocation in a State such as Montana. There is certainly an indication that the ton-mile results have substantial validity, and if time and data were not available for a more complex incremental analysis the use of a ton-mile allocation would not be entirely inappropriate."

Other studies, however, have found just the opposite. In 1951, a study "Highway Finance" prepared for the Ohio Program Commission, commented as follows on the incidence of the gross ton-mile theory:

"In any use of ton-miles for computing cost we are substantially favoring the commercial vehicles and particularly the heavier weight types of commercial vehicles. The reason is that any average ton-mile cost for a whole highway system is based, in part, on the costs of the more expensive elements of construction required to carry heavy vehicles and heavy loads. But passenger cars and light trucks have no need and get no additional use out of these expensive features of highway construction. If these cars could be charged on the basis only of the elements of highway construction which they require and use, their costs per ton-mile would be substantially lower than any average cost."

(c) Cost Function Theory

This approach to highway cost allocation was initially developed by the American Trucking Association. It might best be described as a variation of the incremental theory or a limited incremental concept, because it consists of a segregation of costs which vary with weight only. Other costs which may be affected by size, speed, height, etc., are ignored. Moreover, the lightest weight vehicles share in the cost of all increments of highway cost rather than in only the cost of the basic road. Consequently certain costs which are taken into consideration in a complete analysis of differential costs by the incremental method, in the interests of a reliable basis of user charges for motor vehicles of widely varying characteristics, are omitted under the cost function theory. In effect the cost function concept proceeds on the assumption that large vehicles are no longer, no higher, no wider, no slower - in fact no different from the passenger vehicle other than in weight.

The end result of the cost function method is to shift to passenger and other light vehicles certain costs which the incremental analysis places on heavy vehicles.

It has had little application in highway cost allocation studies to date. It was used in the North Dakota study, 1956, but the author of the report recommended that North Dakota's tax policies should be based on the incremental analysis.

(d) The Differential Benefit Theory

This concept is that user tax payments required of vehicles of different dimensions and weights should be proportional to benefits received from the use of highways. This is an application of the principle of cost allocation according to value of service rather than allocation in proportion to costs occurred.

The analysis of differential benefits is particularly appropriate as an alternative method for determining the share individual users should contribute toward paying for improvement of existing highway systems. Improvement programs are planned to provide users with certain benefits and presumably such programs would not be carried out if the predicted value of user benefits or savings did not equal or exceed the corresponding costs. Since the planning of improvements is influenced by the needs of users, it is entirely logical that the allocation of costs among vehicles of different types and sizes should be measured by the value of the resulting benefits.

The benefits to users of highway improvements include reduction of cost outlays for transportation (less fuel consumption, for example), improved driving conditions (greater comfort and reduced traveling time), and greater safety. One or more of these benefits is achieved through each of the various categories of highway improvements: (a) Reduction in distance between termini, (b) improvement in roadway surface, (c) reduction in rise and fall and improvement in gradients, (d) improvement in alinement and other geometrics, and (e) elimination of impediments to free traffic flow.

The method of differential benefits for the purpose of allocating highway costs among users, while a valid application of the value-of-service principle, has suffered historically from two weaknesses: (a) Lack of experience on the use of benefits for highway cost allocation studies, and (b) incomplete data on the magnitude of certain of the benefits and on the relationship between these benefits and the associated benefit-producing improvements.

THE RAILWAY ASSOCIATION OF CANADA

LIST OF MEMBER LINES

Algoma Central & Hudson Bay Railway
Canadian National Railways
Canadian Pacific Railway Company
Chesapeake & Ohio Railway
Great Northern Railway
Midland Railway Company of Manitoba
New York Central Railroad
Northern Alberta Railways
Ontario Northland Railway
Pacific Great Eastern Railway
Quebec North Shore & Labrador Railway
Toronto, Hamilton & Buffalo Railway
Wabash Railroad Company
White Pass and Yukon Route

TABLE I

ESTIMATED AVERAGE ANNUAL CONTRIBUTION OF ROAD USER TAXES PAID IN 1960
TO THE PROVINCE OF ONTARIO
BY TYPICAL VEHICLES IN PRIVATE AND FOR-HIRE OPERATION

	Gross Vehicle Weight	Annual Travel Miles	Miles per Gallon	Fuel Consumed (gallons)	Annual Licence Fee	Est. Annual Fuel Tax g=gas 13¢ d=diesel 18½¢	User Charges Private Vehicles	Additional For-Hire Carrier Fees and Taxes	User Charges Private & For-Hire Vehicles
Passenger Car	3,500	8,500	16.0	531	\$ 20.00	g \$ 69.03	\$ 89.03	\$	\$ 89.03
Pick-up (2 axle, 4 tire)	5,000	9,000	14.0	643	20.00	g 83.59	103.59	10.00	113.59
Stake (2 axle, 6 tire)	15,000	12,000	10.0	1,200	110.50	g 156.00	266.50	45.00	311.50
Van (3 axle)	19,000	15,000	8.0	1,875	179.00	g 243.75	422.75	65.00	487.75
Tractor Semi-Trailer 2S1	40,000	40,000	5.5	7,272	305.00	g 945.36	1,250.36	130.00	1,380.36
Tractor Semi-Trailer (diesel) 2S2	55,000	60,000	6.5	9,230	500.00	d 1,707.55	2,207.55	210.00	2,417.55
Tractor Semi-Trailer (diesel) 3S2	72,000	70,000	6.0	11,666	737.00	d 2,158.21	2,895.21	270.00	3,165.21
Bus (diesel)	26,000	70,000	6.0	11,666	204.00	d 2,158.21	2,362.21	1,150.00	3,512.21

Note: 2S1 = 3 axle
2S2 = 4 axle
3S2 = 5 axle

Source: Dominion Bureau of Statistics
The Motor Vehicle, 1960
Motor Transport Traffic Ontario, 1959

ONTARIO 1960 ROAD USER CHARGES PER GROSS TON MILE ESTIMATED
FOR EIGHT TYPICAL VEHICLES IN PRIVATE AND FOR HIRE OPERATION

	Gross Vehicle Weight	Tare Weight	Average Annual Travel (miles)	Average Operating Gross Weight	Ton Miles Performed Per Annum	Total Road User Charges	User Charges Per Ton Mile (cents)
Passenger Car	3,500	3,500	8,500	3,500	14,875	\$ 89.03	.60
Pick-up (2 axle, 4 tire)	5,000	3,300	9,000	3,500	15,750	113.59	.72
Stake (2 axle, 6 tire)	15,000	7,500	12,000	10,000	60,000	311.50	.52
Van (3 axle)	19,000	8,500	15,000	12,350	92,625	487.75	.53
Tractor Semi-Trailer 2S1	40,000	18,000	40,000	30,000	600,000	1,380.36	.23
Tractor Semi-Trailer (diesel) 2S2	55,000	22,000	60,000	41,800	1,254,000	2,417.55	.19
Tractor Semi-Trailer (diesel) 3S2	72,000	32,000	70,000	57,600	2,016,000	3,165.21	.16
Bus (diesel)	26,000	18,000	70,000	23,400	945,000	3,512.21	.37

Note: 2S1 = 3 axle
2S2 = 4 axle
3S2 = 5 axle

Source: Dominion Bureau of Statistics
The Motor Vehicle, 1960
Motor Transport Traffic Ontario 1959

TABLE III

AVERAGE FEDERAL AID SYSTEMS COST RESPONSIBILITY PER VEHICLE PER YEAR
FOR TOTAL PRIVATE AND FOR-HIRE CLASS OF OPERATION
BY VARIOUS METHODS REPORTED TO THE HIGHWAY COST ALLOCATION STUDY
(210 STUDY) UNITED STATES, SECRETARY OF COMMERCE.

	Gross Vehicle Weight	Annual Travel Miles (000)	Miles per Gallon	Method (1) Cost Function	Method (2) Differential Benefit	Method (3) Ton Mile	Method (4) Incremental	Federal Average
Passenger Car	4,413	9.5	15.0	\$ 25.08	\$ 31.35	\$ 21.85	\$ 30.66	\$ 27.24
Pick-up (2 axle, 4 tire)	5,000	9.0	12.0	22.14	31.50	20.52	23.28	24.36
Stake (2 axle, 6 tire)	15,000	12.0	8.5	63.00	55.32	68.64	39.52	56.62
Van (3 axle)	19,000	15.0	7.5	96.45	78.45	106.05	58.69	84.91
Tractor Semi-Trailer 2S1	40,000	40.0	5.0	801.60	506.20	949.20	485.26	685.57
Tractor Semi-Trailer (diesel) 2S2	55,000	60.0	5.5	1667.40	870.60	2003.40	862.38	1350.94
Tractor Semi-Trailer (diesel) 3S2	72,000	70.0	4.3	3005.80	1246.30	3594.60	1285.34	2283.01
Bus (diesel)	26,000	70.0	6.5	1321.60	808.50	1565.20	680.78	1094.02

Note: 2S1 = 3 axle
2S2 = 4 axle
3S2 = 5 axle

Source: The Final Report of the Highway Cost Allocation Study
Department of Commerce, United States 1961.

TABLE IV

ESTIMATED AVERAGE UNITED STATES FEDERAL AND STATE ROAD USER CHARGES
COMPARED WITH ONTARIO 1960 ROAD USER CHARGES

	Federal Average of Four Methods 210 Study (Table III)	Present State User Charges	Total User Charges United States Averages	Cents Per Vehicle Mile	Index	1960 Ontario Road User Charges (Table I)	Cents Per Vehicle Mile	Index
Passenger Car	\$ 27.24	\$ 52.00	\$ 79.24	\$ 0.83	1.0	\$ 89.03	\$ 1.05	1.0
Pick-up (2 axle, 4 tire)	24.36	64.00	88.36	0.98	1.2	113.59	1.26	1.2
Stake (2 axle, 6 tire)	56.62	149.00	205.62	1.71	2.1	311.50	2.60	2.5
Van (3 axle)	84.91	227.00	311.91	2.08	2.5	487.75	3.25	3.1
Tractor Semi-Trailer 2S1	685.57	839.00	1524.57	3.81	4.6	1380.36	3.45	3.3
Tractor Semi-Trailer (diesel) 2S2	1350.94	1220.00	2570.94	4.28	5.2	2417.55	4.03	3.8
Tractor Semi-Trailer (diesel) 3S2	2283.01	1900.00	4183.01	5.98	7.2	3165.21	4.52	4.3
Bus (diesel)	1094.02	1200.00	2294.02	3.28	4.0	3512.21	5.01	4.8

Note: 2S1 = 3 axle
2S2 = 4 axle
3S2 = 5 axle

Source: Tables I and III

TABLE V

AVERAGE FEDERAL AID AND STATE HIGHWAY SYSTEMS COST RESPONSIBILITY PER VEHICLE PER YEAR
FOR TOTAL PRIVATE AND FOR-HIRE CLASS OF OPERATION
BY VARIOUS METHODS REPORTED TO THE HIGHWAY COST ALLOCATION STUDY
(210 STUDY) UNITED STATES, SECRETARY OF COMMERCE
COMPARED WITH ONTARIO USER CHARGES 1960

	Gross Vehicle Weight	Annual Travel Miles	Cost Function Method	Differential Benefit Method	Ton Mile Method	Incremental Method	Average 4 Methods	Ontario 1960
Passenger Car*	4,413	9.5	\$ 77.08	\$ 83.35	\$ 73.85	\$ 82.66	\$ 79.24	\$ 89.03
Pick-up (2 axle, 4 tire)	5,000	9.0	86.14	95.50	84.52	87.28	88.36	113.59
Stake (2 axle, 6 tire)	15,000	12.0	212.00	204.32	217.64	188.52	205.62	311.50
Van (3 axle)	19,000	15.0	323.45	305.45	333.05	285.69	311.91	487.75
Tractor Semi-Trailer 2S1	40,000	40.0	1640.60	1,345.20	1,788.20	1,324.26	1,524.57	1,380.36
Tractor Semi-Trailer (diesel) 2S2	55,000	60.0	2887.40	2,090.60	3,223.40	2,082.38	2,570.94	2,417.55
Tractor Semi-Trailer (diesel) 3S2	72,000	70.0	4905.80	3,146.30	5,494.60	3,185.34	4,183.01	3,165.21
Bus (diesel)	26,000	70.0	2521.60	2,008.50	2,765.20	1,880.78	2,294.02	3,512.21

* For Ontario Gross Vehicle Weight
for Passenger Car - 3,500 lbs.

Source:

"The Final Report of the Highway Cost
Allocation Study" of the Dept. Commerce
United States 1961.

Note: 2S1 = 3 axle

2S2 = 4 axle

3S2 = 5 axle

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